

**National Exposure Research Laboratory
Research Abstract**

Government Performance Results Act (GPRA) Goal 4
Annual Performance Measure 277

Significant Research Findings:

Accuracy assessment of the 1992 multi-resolution land characteristics (MRLC) national land cover data (NLCD)**Scientific
Problem and
Policy Issues**

Many air and water-quality models use land cover as a primary data source. Accuracy of land-cover data are therefore important for understanding model results. A statistically rigorous sampling design was used to collect reference data to document the thematic accuracy of the 1992 NLCD, the most widely used land-cover data across EPA.

**Research
Approach**

The main objective of this task was to document the thematic accuracy of the 1992 NLCD. We used a two-stage cluster sampling design to collect 18,000 reference samples across the conterminous United States. The land-cover labels for the photo-based reference samples were compared to the satellite derived map land-cover labels to determine the thematic accuracy.

**Results and
Impact**

Thematic accuracy results show that 1992 NLCD meets nominally established standards (85%) for 8 of 10 EPA Regions and Anderson Level I. Level I thematic accuracy was only 74% for the south-central region (Region 6) and 70% for the mid-Atlantic region (Region 3). The lower overall Level I accuracy for Region 6 was due primarily to confusion between pasture and grassland, and the lower overall Level I accuracy for the mid-Atlantic was due primarily to confusion between forest and agriculture. Level II and I class-specific users accuracies and associated standard errors are reported in Stehman et al. (2002) and Wickham et al. (2004), and these results are also reported at <http://www.epa.gov/mrlc>. The results also demonstrate that land-cover heterogeneity (i.e., many different classes within a small area of the map) and ambiguity in reference label assignment were the primary sources of error. The subset of samples for which no other land-cover classes were within 30 meters showed significantly higher accuracy. Most of the classification error is at the edges between land-cover classes.

**Research
Collaboration and
Research
Products**

The research was done in collaboration with the U.S. Geological Survey and State University of New York (SUNY-ESF). The published research and results are listed below, and reported on the internet at <http://www.epa.gov/mrlc/>.

Wickham JD, Stehman SV, Smith JH, and Yang L. 2004. Thematic accuracy of 1992 National Land-Cover Data for the western United States. *Remote Sensing of Environment* 91:452-468.

Wickham JD, Stehman SV, Smith JH, Wade TG, and Yang L. 2004. A priori evaluation of two-stage cluster sampling for accuracy of large-scale land-cover maps. *International Journal of Remote*

Sensing 25:1235-1252.

Stehman SV, Wickham JD, Smith JH, and Yang L. 2003. Thematic accuracy of the 1992 National Land-Cover Data (NLCD) for the eastern United States: statistical methodology and regional results. *Remote Sensing of Environment* 86:500-516.

Smith JH, Stehman SV, Wickham JD, and Yang L. 2003. Effects of landscape characteristics on land-cover class accuracy. *Remote Sensing of Environment* 84:342-349.

Smith JH, Wickham JD, Stehman SV, and Yang L. 2002. Impacts of Patch Size and Land Cover Heterogeneity on Thematic Image Classification Accuracy. *Photogrammetric Engineering and Remote Sensing* 68:65-70.

Future Research	Research on change detection accuracy assessment is underway.
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